

EPA Region 5 Records Ctr.



390906



PFIZER PIGMENTS INC.

A subsidiary of Pfizer Inc.
2001 Lynch Avenue, East St. Louis, Ill. 62205

cc-Region 6
- Encl.
- Comp. Unit
Orig - Records Unit

June 29, 1987

CERTIFIED MAIL

Illinois Environmental Protection Agency
Division of Water Pollution Control
Compliance Assurance Section
2200 Churchill Road
Springfield, IL 62706

Attention: James E. Frost

Dear Mr. Frost:

Enclosed as directed by the Illinois Pollution Control Board in PCB85-107 is Pfizer's report on the progress towards compliance with our NPDES Permit No. IL0038709. Please contact me if you have any questions concerning our report.

Sincerely,

Roger E. Rader
Plant Manager

Attachment

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JUNE, 1987 VARIANCE COMPLIANCE REPORT

Pfizer Pigments, Inc.'s (Pfizer) East St. Louis, IL facility received a variance from the iron and total suspended solids limits in NPDES Permit No. IL0038709 on March 14, 1986, retroactive to July 22, 1985. The variance required that Pfizer submit periodic reports describing the progress that has been made towards meeting these limits. This report will satisfy this requirement by reviewing the problem, examining the activities to date, and describing the future activities Pfizer has planned.

As explained in the original variance petition, Pfizer uses water from three on-site wells for non-contact cooling in the production of barium sulfate and iron oxide pigments and iron oxide magnetic products. This non-contact cooling water was discharged with process wastewater to the East St. Louis POTW for several years. In 1977, Pfizer learned that a major increase in cost would occur once the American Bottoms Regional Wastewater Treatment Plant, then under design, started operation. To reduce this expense, Pfizer requested an NPDES permit. IEPA granted the permit in 1978. However, due to the natural high iron content of the water from the two wells in service at that time (Wells 12 and 14), Pfizer was unable to meet the iron and total suspended solids limits (the iron reacts with air to precipitate and form solids).

Pfizer next requested a site specific rule change to raise the iron and total suspended solids limits to 20 mg/l and 37 mg/l, respectively. This change was granted on February 10, 1983.

In 1984, a new well (Well 15) was installed to provide a reliable new source of non-contact cooling water for the plant. This was necessary since Well 12 was near the end of its useful life. Unfortunately, Well 15 initially produced water that had a higher iron (and therefore, total suspended solids) concentration than either Wells 12 or 14. This was an unexpected development since Well 15 is drawing water from the same aquifer as Wells 12 and 14. The high iron content of Well 15's water caused Pfizer to exceed the newly-revised iron and total suspended solids limits of the NPDES permit.

Pfizer requested a 32 month variance from the revised permit in order to correct this problem. IEPA and the Pollution Control Board granted a 24 month variance on March 14, 1986, retroactive to July 22, 1985. This variance expires on July 31, 1987.

A review of the data obtained since 1984 indicates the following:

1. The iron and solids concentrations in the noncontact cooling water have decreased since Well 15 initially went on line.
2. The iron, and hence, the suspended solids, are coming from the well water and not from process contamination.
3. There are some unexplained variations in the sample results that cannot be attributed to process contamination.

Each of these conclusions will be discussed individually.

The average iron and suspended solids data from the NPDES Discharge Monitoring Reports, plotted in Figure 1 and listed in Table 1, show that the levels of iron and solids decreased from June, 1984 to April, 1986. These levels sharply increased during the summer of 1986, then quickly dropped off again. This indicates that the iron and solids levels are slowly decreasing to a lower equilibrium level.

Several samples of well water and cooling water were obtained during the variance period to prove that the iron and solids in the

cooling water were indeed coming from the wells. These results, presented in Table 2, clearly show that there is no contamination occurring between the wellhead and the discharge flume in the non-contact cooling water system.

A consulting firm specializing in groundwater (Resources Inc. of Columbus, OH) and the firm that drilled all of the active wells on the plant site (Layne-Western) were hired in 1985 to determine why the water from Well 15 contained more iron than the water from Wells 12 and 14. Their investigations showed that the iron was not due to any contamination from the groundwater at the site but was the result of natural conditions in the aquifer. The St. Clair and Madison county area has varying iron concentrations, as confirmed by the Illinois State Water Survey reports dating back to 1953. State Water Survey Division Contract Report #341, dated March, 1984, commenting on the East St. Louis area, said "although the groundwater samples vary in water chemistry, generally the groundwater can be described as highly mineralized, very hard, and very alkaline, with unusually high soluble iron concentrations."

In addition, the report "Quality of Water in the Alluvial Aquifer, American Bottoms, East St. Louis, Illinois" -- Water Resources Investigations Report 84-4180, by David Voelker, shows that dissolved iron concentrations within a three mile radius of the Pfizer plant wells were as high as 82 mg/l.

Finally, the design and installation of Well 15 was compared with that for Wells 12 and 14. No significant differences were found that could explain the higher iron concentration in the water from Well 15.

These studies indicate that the original high level of iron in the water from Well 15 was the result of iron being leached out of the aquifer's soil around the well's drawdown zone. As the iron around the well casing was removed, the level of iron in the well water decreased.

In April, 1986, the non-contact cooling water useage at the plant increased sharply due to a major production increase. This increased the size of the drawdown zone, with a resultant increase in the iron concentration. As this iron was leached out of the zone, the iron and solids levels again decreased. Assuming that the well water useage does not again increase, Pfizer expects that the iron and suspended solids levels will finally reach an equilibrium point. This will be close to the levels found in Wells 12 and 14, less than 20 mg/l iron and 37 mg/l suspended solids, since the water is coming from the same aquifer.

The NPDES sampling data does contain several discrepancies in the iron and suspended solids results over the past three years. Since the non-contact cooling water discharge system is equipped with a conductivity probe that will detect any contamination and divert the water away from the receiving stream, the results are not due to a major process upset. The contract laboratory reports the results two weeks after the sample is obtained which causes difficulties with reviewing the operation of the system to detect a problem. These discrepancies could be due either to sampling error, contamination of the water, or laboratory error. Pfizer has requested that unusual results be rechecked but this has not indicated a major problem with the lab analysis. Additional work is needed to improve the sampling and analysis methods, which will be discussed later in this report.

Pfizer hired Sverdrup, Inc., a St. Louis consulting engineering firm, to review various treatment alternatives and develop costs for

the optimum method of meeting our limits. Their report showed that a treatment system consisting of aeration to oxidize the soluble iron, followed by a sand filter to remove the precipitated solids would allow the plant to attain our NPDES limits. This system would cost approximately \$580,000 to install and \$40,000 in annual operating costs. After reviewing this proposal with both IEPA and Pfizer's Corporate Engineering staff, it was determined that the cost to treat the water was excessive compared to the minimal amount of pollutants that would be removed. The NPDES monitoring data indicates that the iron and solids in the water will probably stabilize at an equilibrium point below the permit limits. This was a significant factor in our decision. Finally, Pfizer feels that installing a system that will allow Well 14 to run as the main source of water while using Well 15 to maintain pressure during high demand periods will ensure that the plant meets the limits set in the NPDES permit (The current well water system cannot handle the pressures generated when both Wells 14 and 15 are running. Well 14 alone cannot produce enough water to supply the plant and Wells 12 and 14 are no longer able to supply enough water during peak demands.)

As a result of the work accomplished since the variance was actually granted in March, 1986, Pfizer is proposing the following plan:

1. Install a system which will allow both Wells 14 and 15 to operate simultaneously.
2. Revise the sampling procedure to reduce sampling and analysis errors, as well as to immediately pinpoint problems with the system. This will consist of having the lab do the sampling as well as the analysis, thereby reducing the turnaround time for results. Also, three samples will be taken to verify sample results should a question develop.
3. Attempt to reduce the amount of non-contact cooling water used to reduce the demand on the aquifer. This will allow the iron concentration in the well water to reach an equilibrium point more quickly. This reduction will be limited by Pfizer's bond agreement with the American Bottoms Regional Wastewater Treatment Plant Association, which contains a requirement that Pfizer discharge at least 2.0 mgd to the receiving stream. Should Pfizer fail to achieve the 2.0 mgd requirement, the plant will be charged an additional amount by the Regional Treatment Plant.
4. Continue to track the iron and solids levels for 6 months to determine if the iron and solids levels continue to decrease as predicted.

In order to accomplish this plan effectively, Pfizer will submit a request to extend the variance period for 6 months. The extension of time will allow Pfizer to design and install the system to operate both wells simultaneously as well as to verify the continuing decreasing trend in the iron and solids concentration.

Pfizer is prepared to take the appropriate, economical measures needed to achieve the NPDES limits of 20 mg/l iron and 37 mg/l total suspended solids. Pfizer believes that the actions described above will be sufficient to attain these levels by the end of the extended variance period, barring unforeseen developments.

Table 1

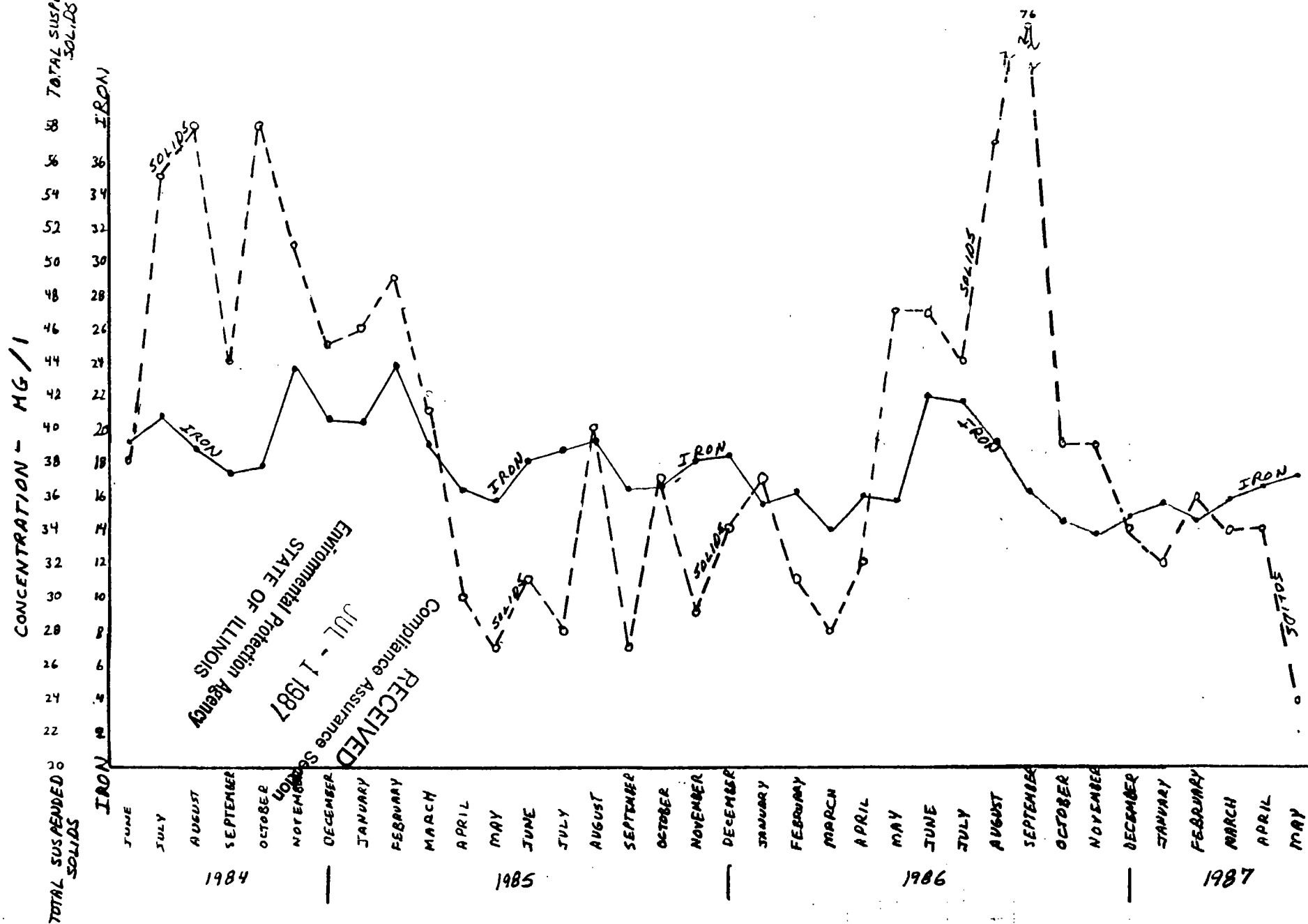
Monthly Average Iron and TSS Concentrations
June 1984 to May 1987

<u>Date Sampled</u>	<u>Total Iron * mg/l</u>	<u>Total Suspended Solids* mg/l</u>
June 1984	19.1	38
July 1984	20.7	55
August 1984	18.7	58
Sept. 1984	17.2	44
Oct. 1984	17.8	58
Nov. 1984	23.6	51
Dec. 1984	20.6	45
Jan. 1985	20.3	46
Feb. 1985	23.7	49
March 1985	19.0	41
April 1985	16.2	30
May 1985	15.8	27
June 1985	18.0	31
July 1985	18.6	28
Aug. 1985	19.1	40
Sept. 1985	16.3	27
Oct. 1985	16.5	37
Nov. 1985	18.0	29
Dec. 1985	18.3	34
Jan. 1986	15.5	37
Feb. 1986	16.1	31
March 1986	14.0	28
April 1986	16.0	32
May 1986	15.7	47
June 1986	22.0	47
July 1986	21.7	44
Aug. 1986	19.1	57
Sept. 1986	16.1	76
Oct. 1986	14.4	39
Nov. 1986	13.8	39
Dec. 1986	14.9	34
Jan. 1987	15.6	32
Feb. 1987	14.5	36
March 1987	15.8	34
April 1987	16.6	34
May 1987	17.2	24

* Monthly Averages from Discharge Monitoring Reports -
NPDES Number IL0038709

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FIGURE 1
MONTHLY AVERAGES
IRON, TOTAL SUSPENDED SOLIDS



• IRON

• TOTAL SUSPENDED SOLIDS

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Table 2
Iron and TSS Concentrations

Date Sampled	Well 12		Well 14		Well 15		Direct Discharge	
	Iron mg/l	TSS mg/l	Iron mg/l	TSS mg/l	Iron mg/l	TSS mg/l	Iron mg/l	TSS mg/l
6/4/84	13.4	-	17.3	-	10.5	-	15.0	29
6/27/84	-	-	-	-	25.2	-	23.3	48
8/7/84	-	-	-	-	22.0	63	21.3	57
12/12/84	-	-	-	-	21.0	-	19.6	48
3/14-18/85	9.18	22	14.2	23	-	-	17.1	45
11/14/85	17.7	16	12.2	18	14.2	20	21.0	29
1/3/86	-	-	-	-	13.8	37	16.4	37
4/15/86	-	-	-	-	17.0	68	17.0	50
3/30/87	-	-	-	-	21.3	-	16.3	-
3/31/87	-	-	-	-	18.8	-	16.1	-
4/1/87	-	-	-	-	16.0	28	15.3	28
4/2/87	-	-	-	-	17.3	-	17.0	-
4/2/87	-	-	-	-	15.0	30	15.2	32
4/4/87	-	-	-	-	16.4	31	15.6	38
4/6/87	-	-	-	-	16.3	-	16.0	-
4/6/87	-	-	-	-	17.9	-	16.9	-

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